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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,460	07/26/2001	Tatsuya Kawahara	77661/55	5110

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EXAMINER

CANTELMO, GREGG

ART UNIT PAPER NUMBER

1745

DATE MAILED: 06/26/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/912,460

Applicant(s)

KAWAHARA, TATSUYA

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 8-10 is/are rejected.
- 7) ☒ Claim(s) 3-7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement filed July 26, 2001 has been placed in the application file and the information referred to therein has been considered as to the merits.

Drawings

3. The drawings received July 26, 2001 are acceptable for examination purposes.

Claim Objections

4. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. claim 1 is drawn to a fuel cell and therein claim 1 defines various structural features of the fuel cell. Claim 10 fails to further define any structure to the fuel

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cell to claim 1 and it would appear that the arrangement of claim 1 itself provides self-humidification since it recirculates water to the oxidant passage.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2 and 9-10 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. patent No. 6,015,634 (Bonville).

Bonville discloses a PEM fuel cell (abstract) including a high temperature portion (outlet end of coolant line across the fuel cell) and a low temperature region (inlet end of coolant line across the fuel cell) the fuel cell comprising: an oxidant passage formed in cathode 16, wherein an oxidant flow is directed from the high temperature portion to said low temperature portion of the fuel cell so that water produced during operation of the fuel cell recirculates in said oxidant passage (Fig. 1 as applied to claim 1).

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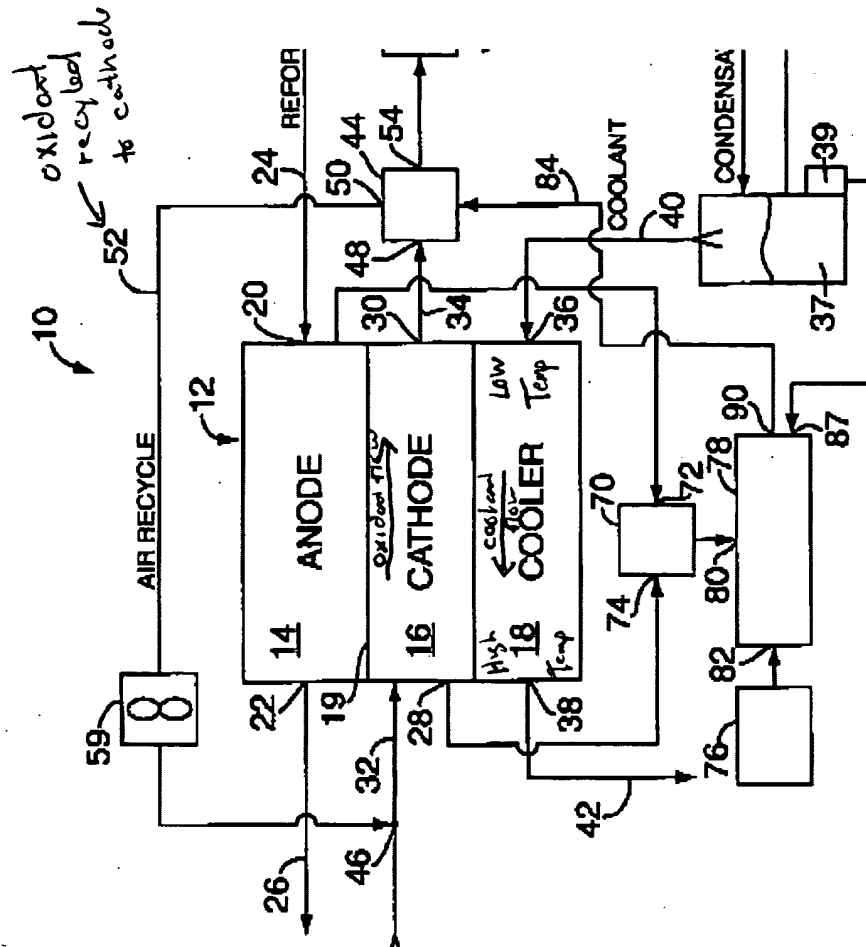


FIG. 1

The low temperature portion is located at a higher position than the high-temperature portion, relative to the coolant outlet side of the fuel cell (Fig. 1 as applied to claim 2).

The fuel gas passage formed in anode 14 includes a gas inlet and gas outlet wherein the fuel gas flow is directed from the low-temperature portion to the high-temperature portion, said fuel gas outlet is positioned lower than said fuel gas inlet relative to the fuel gas outlet side of the fuel cell (Fig. 1 as applied to claim 9).

Self-humidification of the cell is conducted due to the recirculation of the product water to the oxidant passage (as applied to claim 10).

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Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonville in view of JP 07-320755-A (JP '755).

The teachings of claim 1 have been discussed above and are incorporated herein.

The difference between claim 8 and Bonville is that Bonville does not disclose flowing the fuel from the high-temperature portion to the low-temperature portion.

JP -755 discloses flowing fuel gas from the high-temperature portion to the low temperature portion (abstract and figures).

The motivation for flowing the fuel flow from the high temperature portion to the low temperature portion is to improve cell performance by uniformly keeping the humidity of the cell along the fuel passage portion.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Bonville by flowing fuel from the high temperature portion to the low temperature portion since it would have improved cell performance by uniformly keeping the humidity of the cell along the fuel passage portion.

Allowable Subject Matter

9. Claims 3-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 3, none of the prior art of record appear to teach, suggest or render obvious the fuel cell of claim 3 with flowing the oxidant gas in a direction reverse to the direction of gravity.

The advantage of flowing oxidant this way is that as water vapor flows from the high temperature portion to the low temperature portion, the water vapor condenses into water droplets. The formed water droplets then fall back through the passage under the influence of gravity, thus providing self-recirculation of the product water in the cell (see page 11, lines 9-15).

With respect to claims 4-7, none of the prior art of record appear to teach, suggest or render obvious the fuel cell of either of claims 4 or 5 wherein the oxidant passage includes an upstream and downstream portions (claims 4 and 5), said upstream portion being provided with a hydrophilicity treated portion (claim 4), said downstream portion being provided with a hydrophobicity treated portion (claims 4 and 5) and further comprising a water drop atomizing device disposed at a location upstream of an inlet of said oxidant passage (claim 5).

While Bonville discloses the arrangement as recited in claim 1, and further has upstream and downstream portions in the oxidant passage, Bonville fails to teach, suggest or render obvious said upstream portion being provided with a hydrophilicity treated portion (claim 4), said downstream portion being provided

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with a hydrophobicity treated portion (claims 4 and 5) and further comprising a water drop atomizing device disposed at a location upstream of an inlet of said oxidant passage (claim 5).

JP 11-097041-A discloses providing hydrophobic and hydrophilic portions in a polymer electrolyte membrane, but these layers are in the anode flow channels wherein fuel and not oxidant is flown. Furthermore JP 11-097041 does not teach or suggest said upstream portion being provided with a hydrophilicity treated portion (claim 4), said downstream portion being provided with a hydrophobicity treated portion (claims 4 and 5) and further comprising a water drop atomizing device disposed at a location upstream of an inlet of said oxidant passage (claim 5).

There is no teaching or suggestion in the prior art of record to arrive at the arrangements of claims 4-7 and therefore claims 4-7 are deemed allowable over the prior art of record.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 11-097041-A discloses providing hydrophobic and hydrophilic portions in a polymer electrolyte membrane, but these layers are in the anode flow channels wherein fuel and not oxidant is flown.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through

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Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc


June 23, 2003